## **CLAIMS**

What is claimed is:

- 1. A process for producing olefin(s) from oxygenates, the process comprising the steps of:
  - (a) contacting an oxygenate feed stream with an oxygenate-to-olefin catalyst to produce an effluent stream comprising water and olefin(s); and
  - (b) quenching the effluent stream with a quench medium having a pH above 7.0 to produce an olefin stream comprising olefin(s).
- 2. The process of claim 1, wherein the effluent stream further comprises carbon dioxide and the step of (b) quenching removes 5 wt.% or more of the carbon dioxide from the effluent stream based upon the total amount of carbon dioxide in the effluent stream before the step of (b) quenching.
- 3. The process of claim 1, wherein the step of (b) quenching removes 95 wt.% or more of the water from the effluent stream based upon the total amount of water in the effluent stream before the step of (b) quenching.
- 4. The process of claim 1, wherein the effluent stream further comprises alcohol and the step of (b) quenching removes 95 wt.% or more of alcohol from the effluent stream based upon the total amount of alcohol in the effluent stream before the step of (b) quenching.
- 5. The process of claim 1, wherein the effluent stream further comprises aldehydes and/or ketones and the step of (b) quenching removes from about 25 wt.% to about 95 wt.% of the aldehydes and/or ketones from the effluent stream based upon the total amount of aldehydes and/or ketones in the effluent stream before the step of (b) quenching.

- 6. The process of claim 1 wherein the effluent stream further comprises organic acids and the step of (b) quenching removes 95 wt.% or more of organic acids from the effluent stream based upon the total amount of organic acids in the effluent stream before the step of (b) quenching.
- 7. The process of claim 1, wherein the step of (b) quenching uses a quench medium that is an aqueous solution.
- 8. The process of claim 7, wherein the quench medium has a pH ranging from 7.1 to about 11.5.
- 9. The process of claim 1, wherein the step of (b) quenching produces a liquid fraction and a quenched effluent stream.
- 10. The process of claim 1, wherein the quench medium contains caustic.
- 11. The process of claim 1, wherein the effluent stream further comprises methanol.
- 12. The process of claim 1, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the effluent stream before the step of (b) quenching.
- 13. The process of claim 1, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the effluent stream before the step of (b) quenching.
- 14. A process for making a polyolefin product comprising polymerizing the olefin produced in claim 1 to make the polyolefin product.

- 15. A process for making polyolefin(s) from an oxygenate feed stream, the process comprising the steps of:
  - (a) contacting an oxygenate feed stream with an oxygenate-to-olefin catalyst to produce an effluent stream comprising water and olefin(s);
  - (b) quenching the effluent stream with a quench medium having a pH above 7.0 to produce an olefin stream comprising olefin(s) with reduced total amount of water; and
  - (c) converting the olefin(s) to polyolefin(s).
- 16. The process of claim 15, wherein effluent stream further comprises carbon dioxide and the step of (b) quenching removes 5 wt.% or more of the carbon dioxide from the effluent stream based upon the total amount of carbon dioxide in the effluent stream before the step of (b) quenching.
- 17. The process of claim 15, wherein the step of (b) quenching removes 95 wt.% or more of the water from the effluent stream based upon the total amount of water in the effluent stream before the step of (b) quenching.
- 18. The process of claim 15, wherein the effluent stream further comprises alcohol and the step of (b) quenching removes 95 wt.% or more of alcohol from the effluent stream based upon the total amount of alcohol in the effluent stream before the step of (b) quenching.
- 19. The process of claim 15, wherein the effluent stream further comprises aldehydes and/or ketones and the step of (b) quenching removes from about 25 wt.% to about 95 wt.% of the aldehydes and/or ketones from the effluent stream based upon the total amount of aldehydes and/or ketones in the effluent stream before the step of (b) quenching.

- 20. The process of claim 15, wherein the effluent stream further comprises organic acids and the step of (b) quenching removes 95 wt.% or more of organic acids from the effluent stream based upon the total amount of organic acids in the effluent stream before the step of (b) quenching.
- 21. The process of claim 15, wherein the step of (b) quenching uses a quench medium that is an aqueous solution.
- 22. The process of claim 21, wherein the quench medium has a pH ranging from 7.1 to about 11.5.
- 23. The process of claim 15, wherein the step of (b) quenching produces a liquid fraction and a quenched effluent stream.
- 24. The process of claim 15, wherein the quench medium contains caustic.
- 25. The process of claim 15, wherein the effluent stream further comprises methanol.
- 26. The process of claim 15, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the effluent stream before the step of (b) quenching.
- 27. The process of claim 15, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the effluent stream before the step of (b) quenching.
- 28. A process for making a polyolefin product comprising polymerizing the olefin produced in claim 15 to make the polyolefin product.

- 29. A process for purifying an effluent stream withdrawn from an oxygenate-to-olefin reactor, the effluent stream comprising olefin(s), water and carbon dioxide, the process comprising quenching the effluent stream with a quench medium having a pH above 7 thereby removing a majority of the water and removing at least a portion of the carbon dioxide.
- 30. The process of claim 29, wherein the process removes 5 wt.% or more of the carbon dioxide from the effluent stream based upon the total amount of carbon dioxide in the effluent stream before the step of quenching.
- 31. The process of claim 29, wherein the process removes 95 wt.% or more of the water from the effluent stream based upon the total amount of water in the effluent stream before the step of quenching.
- 32. The process of claim 29, wherein the effluent stream further comprises alcohol and the process removes 95 wt.% or more of alcohol from the effluent stream based upon the total amount of alcohol in the effluent stream before the step of quenching.
- 33. The process of claim 29, wherein the effluent stream further comprises aldehydes and/or ketones and the process removes from about 25 wt.% to about 95 wt.% of the aldehydes and/or ketones from the effluent stream based upon the total amount of aldehydes and/or ketones in the effluent stream before the step of quenching.
- 34. The process of claim 29, wherein the effluent stream further comprises organic acids and the process removes 95 wt.% or more of organic acids from the effluent stream based upon the total amount of organic acids in the effluent stream before the step of quenching.

- 35. The process of claim 29, wherein the quench medium is an aqueous solution.
- 36. The process of claim 35, wherein the quench medium has a pH ranging from 7.1 to about 11.5.
- 37. The process of claim 29, wherein the process produces a liquid fraction and a quenched effluent stream.
- 38. The process of claim 29, wherein the quench medium contains caustic.
- 39. The process of claim 29, wherein the effluent stream further comprises methanol.
- 40. The process of claim 29, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the effluent stream before the step of quenching.
- 41. The process of claim 29, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the effluent stream before the step of quenching.
- 42. A process for making a polyolefin product comprising polymerizing the olefin produced in claim 29 to make the polyolefin product.
- 43. A process for quenching an effluent stream from an oxygenate-to-olefin reactor, the process comprising the steps of:
  - (a) providing the effluent stream comprising 40 wt.% or more water, from about 50 wppm to about 2000 wppm carbon dioxide and from about 40 wt.% to about 60 wt.% olefin(s) based upon the composition of the

- effluent stream, the effluent stream further has a temperature above the dewpoint of the effluent stream; and
- (b) contacting the effluent stream with an aqueous quench medium having a pH above 7 and a temperature below the dewpoint of the effluent stream.
- 44. The process of claim 43, wherein the step of (b) contacting removes 5 wt.% or more of the carbon dioxide from the effluent stream based upon the total amount of carbon dioxide in the effluent stream before the step of (b) contacting.
- 45. The process of claim 43, wherein the step of (b) contacting removes 95 wt.% or more of the water from the effluent stream based upon the total amount of water in the effluent stream before the step of (b) contacting.
- 46. The process of claim 43, wherein the effluent stream further comprises alcohol and the step of (b) contacting removes 95 wt.% or more of alcohol from the effluent stream based upon the total amount of alcohol in the effluent stream before the step of (b) contacting.
- 47. The process of claim 43, wherein the effluent stream further comprises aldehydes and/or ketones and the step of (b) contacting removes from about 25 wt.% to about 95 wt.% of the aldehydes and/or ketones from the effluent stream based upon the total amount of aldehydes and/or ketones in the effluent stream before the step of (b) contacting.
- 48. The process of claim 43, wherein the effluent stream further comprises organic acids and the step of (b) contacting removes 95 wt.% or more of organic acids from the effluent stream based upon the total amount of organic acids in the effluent stream before the step of (b) contacting.

- 49. The process of claim 43, wherein the quench medium has a pH ranging from 7.1 to about 11.5.
- 50. The process of claim 43, wherein the step of (b) contacting the effluent stream with the quench medium produces a liquid fraction and a quenched effluent stream.
- 51. The process of claim 43, wherein the quench medium contains caustic.
- 52. The process of claim 43, wherein the effluent stream further comprises methanol.
- 53. The process of claim 43, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the effluent stream before the step of (b) contacting.
- 54. The process of claim 43, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the effluent stream before the step of (b) contacting.
- 55. A process for making a polyolefin product comprising polymerizing the olefin produced in claim 43 to make the polyolefin product.